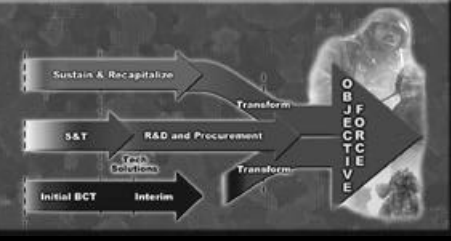




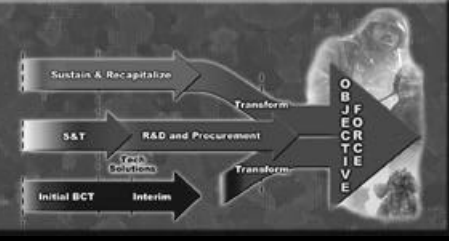
TOW Bunker Buster



Mr. Jeff Starks
PM TOW Bunker Buster
PEO Tactical Missiles



TOW Bunker Buster Requirements



“Breach a Masonry Wall”

- Provide for a minimum through hole of 24” diameter in the 8” double reinforced concrete wall
- Wall requirements defined by Human Engineering Laboratory (HEL) Technical Manual (TM) 30-78

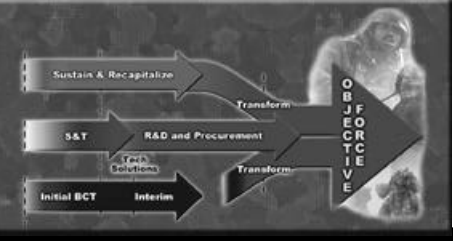


“Defeat a Bunker”

- Provide a structural overmatch of the Soviet engineered earth & timber bunker
- Bunker requirements defined by HEL TM 30-78
 - Aperture is closed not allowing it to be used as a firing port
 - Roof of the structure has fallen into the crew compartment not allowing re-fortification



TOW Bunker Buster Assumptions

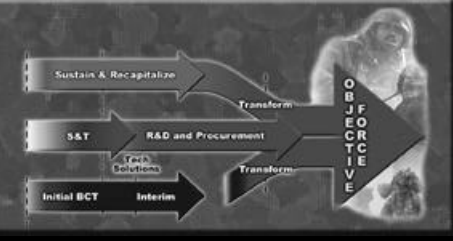


- ❑ Complete development of safe & effective missile within 12 months
 - Uses existing flight algorithms for TOW 2A missile
 - Maintain TOW 2A accuracy and range
 - 50 missiles For qualification testing
 - 50 missiles available for additional testing
 - Use existing mechanical safe and arm device
 - Minimal Insensitive Munitions testing and/or IM waiver required
 - Conduct user test
 - Do not increase logistical support structure requirements
 - Make it simple to use
- ❑ Retrofit & field 500 modified TOW 2A missiles within 4 months of MDA decision

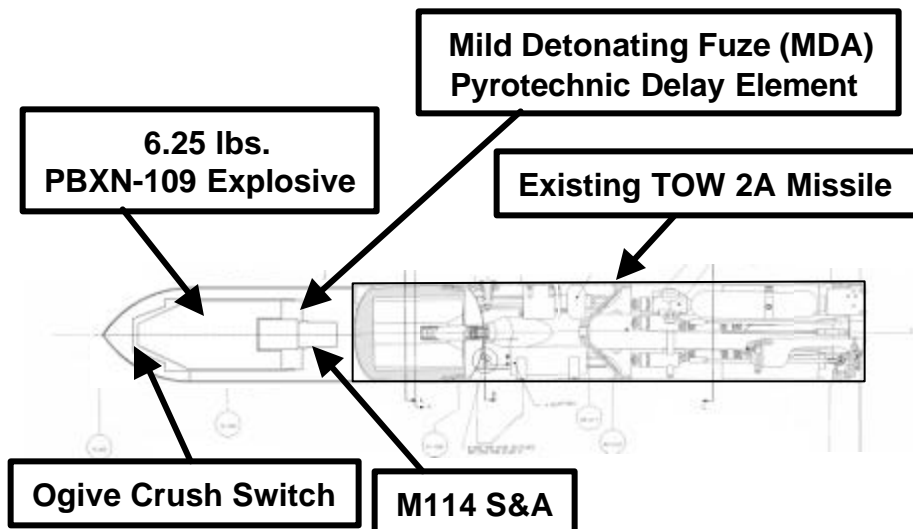
Bottom Line: Brute Force Solution That Is Safe and Effective



TOW Bunker Buster Concept



Missile Overview



Technical Approach

- Develop fragmenting HE bulk charge warhead leveraging Hellfire blast-fragment effort
- Use existing mechanical safe & arm device
- Retrofit existing TOW 2A missiles
- Use existing flight algorithms

Risks

- Pyrotechnic delay design & packaging
- Maintaining minimum safe & arm distance

Developmental Concept

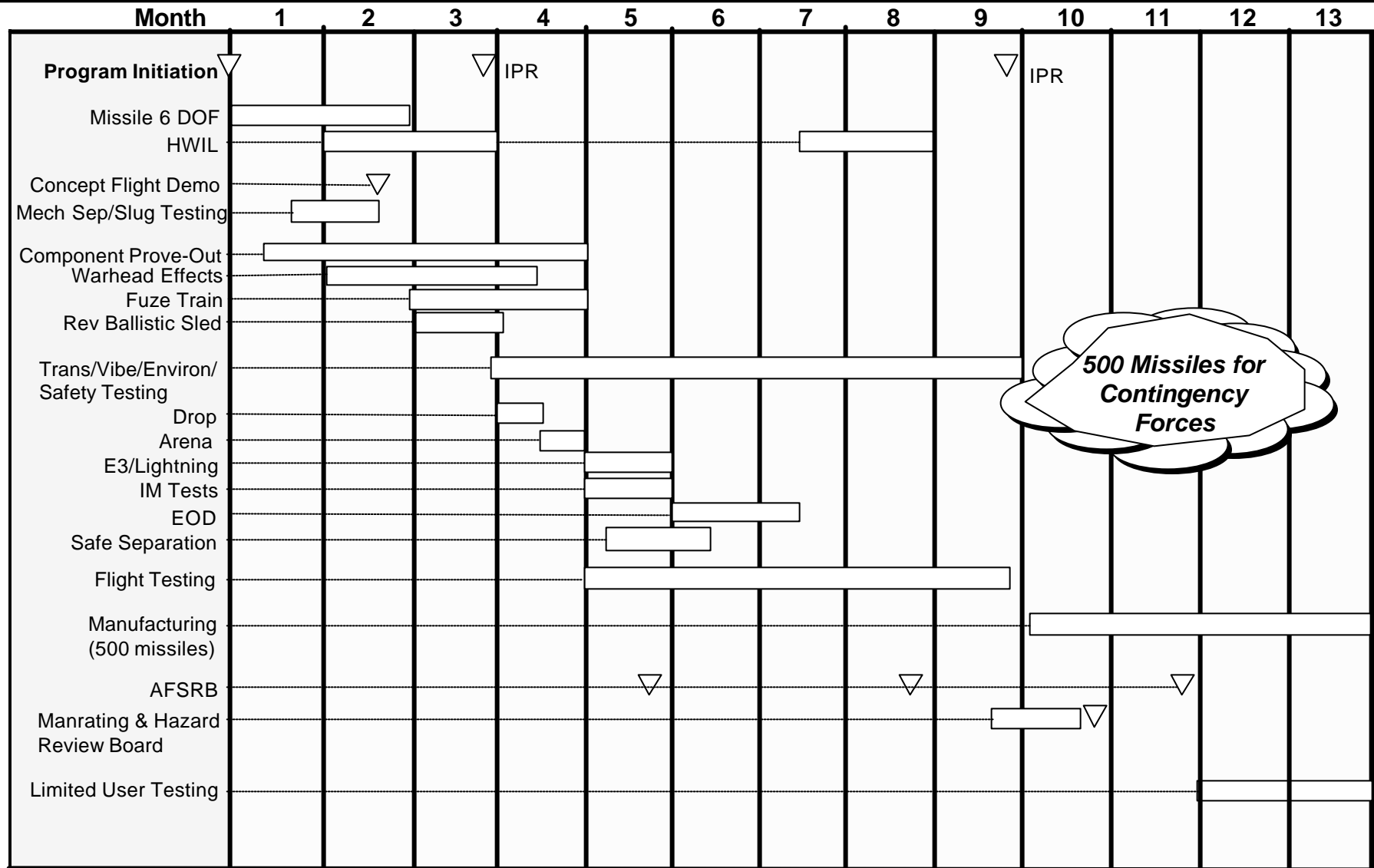
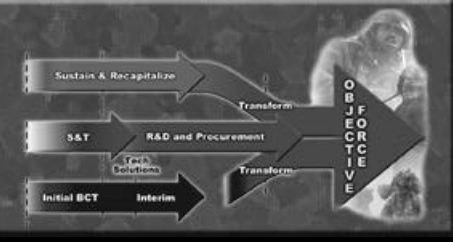
- Joint Government / Contractor development effort
- PRIMEX (Hi-Tech) loads PBXN 109 at Camden, AR (existing T&M contract)
- RDEC / RTTC integrates warhead assembly
- Raytheon conducts modeling & simulation efforts & missile retrofit via existing Engineering Services contract
- 50 missiles for qualification testing
- 50 missiles available for other testing

500 Missile Retrofit Concept

- Government fabrication and assembly
 - Hi-Tech loads PBXN 109
 - AMRDEC fabricates warhead assembly
- Warhead retrofit at Anniston Munitions Center via MIPR
 - 500 completed missiles delivered to Anniston Munitions Center for contingency storage
 - Missiles issued at DSCOPS direction to support contingency operations



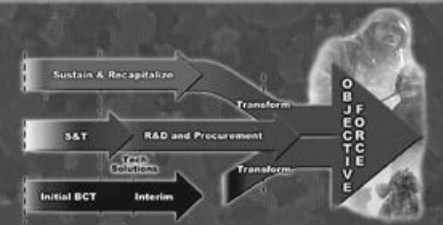
TOW Bunker Buster Schedule



**500 Missiles for
Contingency
Forces**



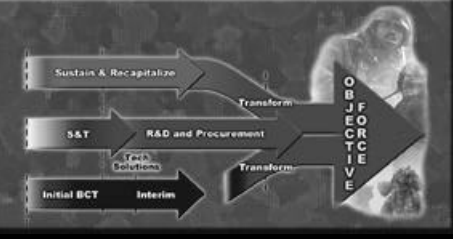
TOW Bunker Buster



Back-up Slides

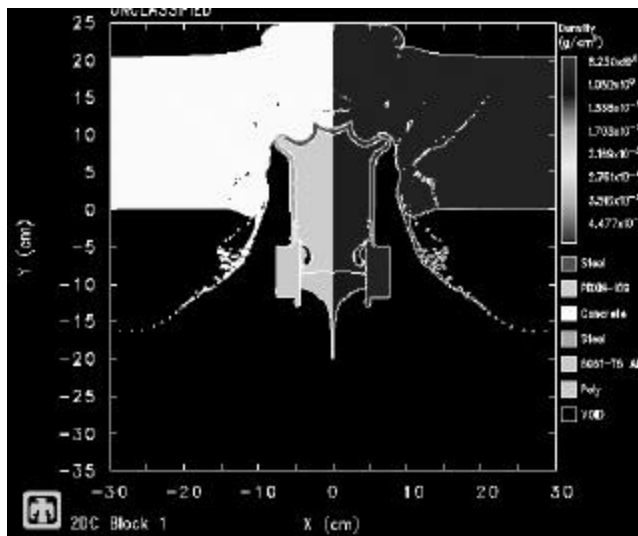


TOW Bunker Buster Risk Reduction



AIRGUN Test – Inert Warhead Structure Tests

- Three concepts tested to evaluate “Squash” – “HESH” reactions to target engagement
 - Thin Wall Steel
 - Thick Wall Steel
 - Thick Wall Aluminum
- All three tests successful
- Thick wall steel chosen to provide “Squash” while maintaining explosive train for Optimum Blast Effects (shown below)



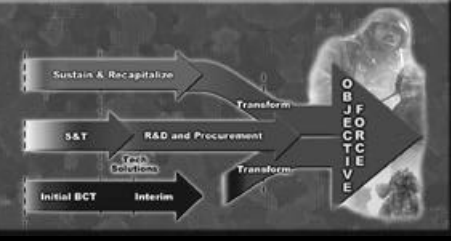
Hydrocode Run



Recovered Hardware



TOW Bunker Buster Risk Reduction



Missile Test – TOW 2A With Probe Fixed In Stowed Position

- This test was designed to replicate the mass, CG, and aerodynamic profile of the proposed TOW Bunker Buster missile
- The aerodynamic flight test was extremely successful
- Proved that this profile/configuration could be flown as proposed using existing flight software and guidance algorithms
- The missile impacted the target 8” right and 4” high at 2K range

